DEPARTMENT OF HEALTH & HUMAN SERVICES Public Health Service

Food and Drug Administration
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Silver Spring, MD 20993-0002

January 16, 2015

Collagen Matrix, Inc.
Peggy Hansen
Senior VP, Marketing and Regulatory Affairs
15 Thornton Road
Oakland, New Jersey 07436

Re: K141608
Trade/Device Name: Collagen Dura Membrane
Regulation Number: 21 CFR 882.5910
Regulation Name: Dura Substitute
Regulatory Class: Class II
Product Code: GXQ
Dated: December 15, 2014
Received: December 17, 2014

Dear Ms. Hansen,

We have reviewed your Section 510(k) premarket notification of intent to market the device referenced above and have determined the device is substantially equivalent (for the indications for use stated in the enclosure) to legally marketed predicate devices marketed in interstate commerce prior to May 28, 1976, the enactment date of the Medical Device Amendments, or to devices that have been reclassified in accordance with the provisions of the Federal Food, Drug, and Cosmetic Act (Act) that do not require approval of a premarket approval application (PMA). You may, therefore, market the device, subject to the general controls provisions of the Act. The general controls provisions of the Act include requirements for annual registration, listing of devices, good manufacturing practice, labeling, and prohibitions against misbranding and adulteration. Please note: CDRH does not evaluate information related to contract liability warranties. We remind you, however, that device labeling must be truthful and not misleading.

If your device is classified (see above) into either class II (Special Controls) or class III (PMA), it may be subject to additional controls. Existing major regulations affecting your device can be found in the Code of Federal Regulations, Title 21, Parts 800 to 898. In addition, FDA may publish further announcements concerning your device in the Federal Register.

Please be advised that FDA's issuance of a substantial equivalence determination does not mean that FDA has made a determination that your device complies with other requirements of the Act or any Federal statutes and regulations administered by other Federal agencies. You must comply with all the Act's requirements, including, but not limited to: registration and listing (21 CFR Part 807); labeling (21 CFR Part 801); medical device reporting (reporting of medical device-related adverse events) (21 CFR 803); good manufacturing practice requirements as set forth in

the quality systems (QS) regulation (21 CFR Part 820); and if applicable, the electronic product radiation control provisions (Sections 531-542 of the Act); 21 CFR 1000-1050.

If you desire specific advice for your device on our labeling regulation (21 CFR Part 801), please contact the Division of Industry and Consumer Education at its toll-free number (800) 638-2041 or (301) 796-7100 or at its Internet address http://www.fda.gov/MedicalDevices/ResourcesforYou/Industry/default.htm. Also, please note the regulation entitled, "Misbranding by reference to premarket notification" (21 CFR Part 807.97). For questions regarding the reporting of adverse events under the MDR regulation (21 CFR Part 803), please go to http://www.fda.gov/MedicalDevices/Safety/ReportaProblem/default.htm for the CDRH's Office of Surveillance and Biometrics/Division of Postmarket Surveillance.

You may obtain other general information on your responsibilities under the Act from the Division of Industry and Consumer Education at its toll-free number (800) 638-2041 or (301) 796-7100 or at its Internet address http://www.fda.gov/MedicalDevices/ResourcesforYou/Industry/default.htm.

Sincerely yours,

Carlos L. Pena -S

Carlos L. Peña, PhD, MS
Director
Division of Neurological
and Physical Medicine Devices
Office of Device Evaluation
Center for Devices and Radiological Health

Enclosure

DEPARTMENT OF HEALTH AND HUMAN SERVICES
Food and Drug Administration

Indications for Use

Form Approved: OMB No. 0910-0120
Expiration Date: January 31, 2017
See PRA Statement below.

510(k) Number *(if known)*
K141608

Device Name
Collagen Dura Membrane

Indications for Use *(Describe)*
Collagen Dura Membrane is intended for use as a dura substitute for the repair of dura mater.

Type of Use *(Select one or both, as applicable)*

☒ Prescription Use (Part 21 CFR 801 Subpart D) ☐ Over-The-Counter Use (21 CFR 801 Subpart C)

CONTINUE ON A SEPARATE PAGE IF NEEDED.

This section applies only to requirements of the Paperwork Reduction Act of 1995.

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510(k) SUMMARY

1. Applicant Information

Applicant Name: Collagen Matrix, Inc.
Address: 15 Thornton Road
Oakland, New Jersey 07436
Telephone: (201) 405-1477
Fax: (201) 405-1355
Contact Person: Peggy Hansen, RAC
VP, Clinical, Regulatory, QA, and Marketing

Date Prepared: January 15, 2015

2. Name of the Device

Device Common Name: Dura Substitute
Device Trade Name: Collagen Dura Membrane
Device Classification Name: Dura Substitute
21 CFR 882.5910
Product Code GXQ
Device Class II

3. Legally Marketed Devices to Which Substantial Equivalence is Claimed

Predicate Device(s): Durepair® Dura Regeneration Matrix
K052211

4. Description of the Device

Collagen Dura Membrane is a white, nonfriable, conformable, resorbable, membrane matrix consisting of highly purified collagen derived from bovine dermis. It is flexible and conforms to the contours of the defect site. The product's mechanical strength allows the membrane matrix to be sutured in place. Collagen Dura Membrane is supplied sterile, non-pyrogenic, in various sizes, and for single use only.

5. Intended Use

Collagen Dura Membrane is intended for use as a dura substitute for the repair of dura mater.

6. Summary/Comparison of Technical Characteristics

Collagen Dura Membrane has been determined to be substantially equivalent to the predicate devices having similar technological characteristics as follows:

Parameter	Collagen Dura Membrane (This submission)	Durepair® Dura Regeneration Matrix
Indications for Use	Intended for use as a dura substitute for the repair of dura mater.	Intended for use as a dura substitute for the repair of dura mater.
Collagen Source	Bovine dermis	Bovine dermis
Form	Membrane	Membrane
Color	White to off-white	White to off-white
Physical Integrity	Non-friable	Non-friable
Sizes	Variety of sizes	Variety of sizes
Suture Strength	Can be sutured	Can be sutured
Biocompatibility	Biocompatible	Biocompatible
In Vivo Stability	Gradual resorption	Gradual resorption
Sterility	Sterile, SAL 10^{-6}	Sterile, SAL 10^{-6}
Pyrogenicity	Non-pyrogenic	Non-pyrogenic
Single Use/Reuse	Single use only	Single use only
Packaging	Double peel package	Double peel package

7. Discussion of Non-clinical Testing

The substantial equivalence of Collagen Dura Membrane and its predicate was demonstrated based on *in vitro* characterization studies, biocompatibility studies, and an animal efficacy study.

Non-clinical testing was performed in accordance with FDA recognized consensus standards and FDA guidelines as follows:

FDA Guidance Document entitled, “Guidance document for Dura Substitute Device: Guidance for Industry”, issued on November 9, 2000

ISO 22442-1 Animal Tissues and Their Derivatives Utilized in the Manufacture of Medical Devices – Part 1 Analysis and Risk Management

ISO 22442-2 Animal Tissues and Their Derivatives Utilized in the Manufacture of Medical Devices – Part 2 Controls on Sourcing, Collection, and Handling

ISO 22442-3 Animal Tissues and Their Derivatives Utilized in the Manufacture of Medical Devices – Part 3 Validation of the Elimination and/or Inactivation of Viruses and Transmissible Agents

ISO 10993-3:2009 Biological Evaluation of Medical Devices- Part 3: Tests for genotoxicity, carcinogenicity and reproductive toxicity

ISO 10993-5:2009 Biological Evaluation of Medical Devices- Part 5: Tests for in vitro cytotoxicity

ISO 10993-6:2009 Biological Evaluation of Medical Devices- Part 6: Test for local effects after implantation

ISO 10993-10:2009 Biological Evaluation of Medical Devices- Part 10 Test for local effects after implantation

ISO 10993-11:2009 Biological Evaluation of Medical devices – Part 11 Tests for systemic toxicity

Non-clinical Testing Conducted

In vitro product characterization testing was performed to demonstrate substantial equivalence of the subject device to its predicate device. A series of bench tests were conducted to evaluate material properties, biological properties, chemical and physical properties. The comparative bench testing is summarized in the table below.

Test	**Test Method**	**Results**
Dimensions	Measurements	Dimensions similar to predicate device
Suture pullout strength	Internal test method using mechanical test apparatus	Suture strength similar to predicate device
Tensile strength	Internal test method using mechanical test apparatus	Tensile strength similar to predicate device
Conformability	Internal test method to measure drape angle	Conformability similar to predicate device
Hydrothermal transition temperature	Internal test method using differential scanning calorimeter	Hydrothermal transition temperature similar to predicate device.
Porosity / Permeability	Internal test method	Permeability similar to predicate device

A series of *in vitro* and *in vivo* biocompatibility testing was performed to assess safety of the Collagen Dura Membrane as an implantable material. The biocompatibility testing performed is summarized in the table below.

Test	**Test Method/ Model**	**Results**
Cytotoxicity	ISO Agarose Overlay Method - Extract, ISO 10993-5	Non-cytotoxic.
Sensitization	Murine Local Lymph Node Assay, ISO 10993-10	Not considered to be sensitizing.
Intracutaneous Reactivity	Acute Intracutaneous Reactivity in Rabbit, ISO 10993-10	No erythema and no edema from the test extract injected intracutaneously into the rabbits.
Acute	ISO Systemic Toxicity in Mice,	No mortality or evidence of significant

Test	Test Method/ Model	Results
Systemic Toxicity	ISO 10993-11	systemic toxicity.
Genotoxicity	Bacterial Reverse Mutagenic Study, ISO 10993-3	Non-mutagenic to *Salmonella typhimurium* tester strains TA98, TA100, and TA1537, and to *Escherichia coli* strain WP2*uvrA*.
Genotoxicity	Mouse Lymphoma Assay, ISO 10993-3	None of the test article treatments induced substantial increases in the number of revertant colonies. Based on the criteria and conditions of the study protocol, the test article is considered non-mutagenic.
Genotoxicity	In Vivo Mouse Micronucleus Assay, ISO 10993-3	None of the mice treated with the test article preparations exhibited overt signs of toxicity either immediately post-treatment or during the induction period. The levels of micronucleated cells were within normal negative ranges. Based on the criteria and conditions of the study protocol, the test article is considered non-mutagenic.
Pyrogenicity	USP (151) Pyrogen Study – Material Mediated	The test article was judged as nonpyrogenic.
Implantation	Subcutaneous Implantation in Rats, ISO 10993-6	Minimum tissue reaction up to 4 weeks of implantation and no adverse tissue reaction to the host.
Subchronic Systemic Toxicity	Subcutaneous Implantation in Rabbits, ISO 10993-11	There was no evidence of systemic toxicity or adverse findings attributed to the test article at 13 week time point.
Chronic Toxicity	Subcutaneous Implantation in Rabbits, ISO 10993-11	There was no evidence of systemic toxicity or adverse findings attributed to the test article at 26 week time point.

An animal efficacy study and additional animal studies were conducted to evaluate the device as compared to its predicate device. No clinical tests were performed on the product; however clinical history of the predicate device was referenced in the submission. The animal studies performed are summarized in the table below.

Test	Test Method/ Model	Results
Dura Repair and Resorption	Rabbit dural defect repair model using the subject device and predicate device as a control	Subject device performed as well as the predicate device
Resorption	Rat subcutaneous model using the subject device	Resorption profile verified design criteria
Handling, Implantability	Canine craniectomy model for implanting the subject device and predicate device	Subject device handles as well as the predicate device using typical surgical technique for implantation

Viral inactivation studies were performed to ensure the viral safety of the product.

8. Conclusion of Non-clinical Studies

The predicate device was cleared based on the results of non-clinical data. Subject and predicate device performance data were compared to support the safety of the subject device and demonstrate that the Collagen Dura Membrane should perform as intended in the specified us conditions.